N.A.C.A. BULLETIN

In Two Sections

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VOL. XXVIII, NO. 7 DECEMBER 1, 1946

EDITORIAL DEPARTMENT NOTE

Are accountants as a group so immersed in the technicalities of their work that they fail to give sufficient consideration to selling the results of their work to management in such a way that it will be used to the maximum? The author of the first article in this issue thinks so and offers various suggestions on methods for obtaining a better understanding and greater appreciation of the accountant's work.

JOHN A. HANDY, JR., the author of this article, is a graduate of the Harvard Business School and Assistant Controller of the Carborundum Co. He is currently serving as President of the Buffalo Chapter of the Nation Office Management Association.

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Probably most industrial accountants will agree that the most difficult costs from a control viewpoint are those generally described as "repairs and maintenance." The methods and procedures which have helped one company to obtain a better control of maintenance costs are described in the second article in this issue.

EARL V. HOPTON, the author of this article, is Budget Director of the Armstrong Cork Co., whose methods he describes. He has been in charge of the Budget Department of his company for the past fifteen years.

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Each industry has its own peculiar cost accounting problems. Our third article, dealing with the cost accounting problems of oil well drilling contractors, is another in the extensive series of N. A. C. A. articles concerned with the cost methods of specific industries.

LELAND BRECKENRIDGE, author of this article, is Secretary of the American Association of Oilwell Drilling Contractors. Engaged in various phases of petroleum accounting for over twenty years, he joined the A.A.O.D.C. in 1945 as coordinator of their accounting program.

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Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the views expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

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This *Bulletin* is published semimonthly by the National Association of Cost Accountants, 385 Madison Ave., New York 17, N. Y. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

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NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

DECEMBER 1, 1946

SALESMANSHIP AS AN ACCOUNTING TOOL

by JOHN A. HANDY, Jr., Assistant Controller
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MANY may wonder how a topic like salesmanship can appear in the *N. A. C. A. Bulletin.* By salesmanship, of course, we do not mean the high pressure, medicine-man type, but rather refer to selling based on persuasion through careful, logical, and simple presentation of facts and figures in such a manner that these facts are self-evident and, therefore, stand on their own. Yet salesmanship, even of this type, does not usually appear in the job specifications of most accounting executives. Therefore, how did such a black sheep ever manage to slip into print in the inner sanctum of our *N. A. C. A. Bulletin?* Well, for one reason, because accountants, particularly those trained technicians in our field, probably give less consideration to selling and merchandising than is frequently required. Secondly, as trained technicians in our respective accounting fields, it is sometimes difficult for us to appreciate the point of view of the other fellow, who is attempting to understand and use our figures and accounting data. These conclusions are based largely on personal observation. Coming into the profession by the back door of personnel and office management has given me an opportunity to view our work from both sides of the fence.

Need for Salesmanship

As accountants, most of us have been trained for years to analyze, scrutinize, reconcile, balance, build up, tear down, and reconstruct everything on a factual figure basis, resolving each detail to the last gnat's eyebrow. Upon the completion of a complicated analysis which balances out to the last mill, we oftentimes gleam with pride and glow with an inner satisfaction, feeling that we have resolved a great truth which is bound to shake the very pillars of our organization from stem to stern. But what happens? Only too often there follow bitter pangs of disappointment when the top management fails to share our jubilation or appreciate the full import of our discovery. We design cost systems, budget programs, and profit forecasts which bristle with accounting implications and ramifications. We make correlations, verifications,

and statistical analyses so expertly and so minutely as to confound all but the most agile and technically trained mind. We amuse ourselves with our associates in long-winded discussions of highly complicated tax matters or involved discussions on new depreciation theories. Yet in our thinking how many of us ever give serious thought or attention to how best to present, to sell, and to merchandise our valuable findings to others in our organization who must use them as operating tools?

While we are fully cognizant of the fact that no budget program, cost program, or, for that matter, any other important program has ever been truly effective unless it has been sold solidly to all operating personnel in our organization, still we sometimes fail to put the necessary emphasis on this very important phase of our work. What steps, then, can we, as accountants, take to improve our sales technique and to insure a better understanding and greater acceptance of our work?

Keep It Simple!

Few people outside of the accounting profession understand the terms and phraseology used by trained accountants. Therefore, we should use simple terms which are meaningful to the layman who has to use our figures. We should not be afraid of being technically incorrect if the term we use conveys generally the thought which we wish to convey. If our prospect does not understand the meaning of obsolescence, depreciation, or "exhaustion of installment service goods," then we should tell him the damned thing is wearing out due to wear and tear and old age and for this reason we have to write off a certain amount of it each year. Accruals, deferrals, amortizations, debits, credits, etc., are meaningless terms to the average operating person. Every profession has its own lingo, which only those in the profession can understand. Did you ever overhear a shoptalk conversation between two doctors, two chemists or, for that matter, two amateur photographers? Confusing, isn't it? Let us not confound the operating people with a pyrotechnic display of our accounting vocabulary. They know we are good accountants or the company would not have us on the payroll. So let's keep it simple, direct, and to the point!

Forget the Gnat's Eyebrow!

Our profession requires that our trial balances balance to the cent. We rejoice in accuracy and when everything can be resolved

to the last mill a great feeling of satisfaction wells up within us. Yet, in selling our findings we seldom appreciate that the operators do not care whether the figures balance to the last penny or not. We must, therefore, stress the fundamentals, the broad relationships, the basic trends, and the inherent significances, rather than the minute details. We even must be willing to sacrifice the presentation of many details and the qualifications in all data which affect our figures pro and con, in the interest of painting a clear picture. (This may sound sacrilegious to some.)

I once heard two accountants discussing the question of whether or not an inventory had gone up. This inventory was made up of many items, and they were deeply engrossed in the discussion of many of the transactions which had taken place; transfers to inactive stock, and back again to active stock, substitutions, valuation changes, cost and market relationships, etc., etc. I thought to myself how many times are we guilty of using detailed, unintelligible presentations in explaining problems to a layman. In presenting any figures or data, therefore, before qualifying them we should ask ourselves: What difference does it make in the total picture? Small qualifying figures which may be of great significance to us, as accountants, are often of little significance and no importance to operating people. Let us limit the use of them in our presentation.

One controller of a company never could get his information to his president and board of directors in time to be of any practical use from an operating point of view because he was too busy qualifying, checking, double-checking, and triple-checking every thing to the last split hair. Even if he had been in error a small percentage one way or the other, he would have been better off to have presented *timely* data to his management, correcting the errors later.

Some years ago, the Dean of one of the country's leading business schools stated to his assembled students, apropos of a company's balance sheet involving assets of several million dollars, that if he were called to the stand to testify to the accuracy of this company's balance sheet, he would have difficulty in certifying it to a closer tolerance than plus or minus a million dollars. As accountants, we often laugh at the statistician who through a series of multiple correlations using highly involved mathematical formulas, projects a line ten years into the future. The humor in this situation seems so obvious—to see a mathematically precise

formula being used to measure, at best, a fairly wild guess. Yet, how often do we do the same thing? Let us not then be caught in the act of drawing the mathematically straight line from a hypothetical assumption to a foregone conclusion.

Use Charts!

As accountants we read tables of figures like the average layman reads his newspaper. Relationships, discrepancies, errors, etc. stand out to us as though they were in bold type, but to the average operator columnar figures mean little, if anything. So let's use charts—any kind will do—bar charts, pie charts, Gantt charts, graphs, lines of relationships, or anything else. Make them simple! We should not use too many lines or too many bars. We can use colors—everybody likes colors. We should label them clearly but simply, round off all figures, and highlight any significant relationships or fundamental trends. We should show the operators charts that they can use and understand; that they can show to their employees, and that the the employees can understand. In presenting any type of financial data, budgetary data, or cost data, we should illustrate the significant data and tell them what they mean, why they are significant, and most important, how they can be used as a tool to improve a given condition. We can draw pictures—people like pictures. Even moderate humor is sometimes acceptable. People are not all as serious as accountants. The best way to describe a big red apple is to draw a picture of one. Therefore, let us draw pictures and use charts.

Use a Rifle!

The shotgun approach is only good for hunting small game. When we are going out for big game we should use the rifle and hit home. In all the volumes of accounting reports, documents, recapitulations, and reconciliations which are ground out in most industries each month, there are only a relatively small number of fundamental reports which need to be highlighted and brought to the attention of management and the operators. We should not kill them with detail. We should not befog the main issues with too many reports, charts, graphs, papers, or figures. Let us remember that our management and operators are only human and can absorb only so much at one sitting. We should try to give them the fundamentals in a concentrated dose. We should shoot for the bull's eye and save the extraneous reports to discuss with each other at the N. A. C. A. meetings.

"Say It With Flowers!"

All the world loves a lover but nobody loves a sourpussed accountant who delivers a financial report to the boss's desk with the statement that the business is going broke. Even if the business is going broke we might as well smile, because if we smile the boss will like us better and there is a better chance that we will be able to point out to him the seriousness of the situation by selling him on the data which we have to present.

One of Elmer Wheeler's great principles, "sell the sizzle and not the steak," applies to accounting as well. We should sell our basic ideas and concepts and not the general ledger. Who the devil besides us is interested in the general ledger? Furthermore, we should not scare the patient to death. Rarely does a doctor ever tell a patient he is going to die, even if he thinks so. No operating person likes to hear bluntly the bold and bloody truth, about his own operations, particularly if it is bad. Let's coat the pill with sugar but still not compromise the basic data. Let's remember that honey still catches more flies than vinegar. We should think in terms of our major objectives. It is well to consider what we are trying to accomplish.

As professional men, of course, it is our job to present the facts, good, bad, or indifferent. But we cannot expect the operator to decrease the cost in his plant department if we knock him out with our report. We should not pull our punches but we can wear soft gloves. You are all familiar with the old song "It is not what you do, it's the way that you do it." In our work it is not only what we present but the way we present it. An accounting report is an accounting report and the facts cannot be altered. Therefore, the emphasis should be on our technique of presentation. To illustrate, let us assume that we meet a close friend of ours on the street and notice that he has a big, black streak of dirt on his cheek. We wish to bring this fact to our friend's attention. We can adopt one of two techniques. We may say "Say, Bill, your left cheek is dirty. What's the matter—don't you ever take a bath?" Or, we may say "Say, Bill, you've got a little black mark or cinder on your left cheek. The wind is blowing up a lot of dust today. Thought you would want to know about it before you went back to the office." In both cases we present the same fact. Moral: The report should be presented in such a way that the man receiving it feels that it is designed to help rather than hurt him.

Sell the Boss!

The accounting department is the switchboard and nerve center of any organization. The effectiveness with which all accounting information is presented and sold to the boss and top management determines the success of many accountants as well as the success of many organizations. Let us remember that just because we are professional men does not mean the boss will always listen to us. The boss's doctor is also a professional man and he told the boss to stop smoking because it was bad for his heart, but the boss still keeps on smoking. So let us get up from our bed of professional laurels and do a real selling job with top management. Let us give them the broad facts and fundamentals quickly. We should not waste their time with details but should be prepared to answer any and all questions regarding detail. We should be fair and honest, and particularly careful to give credit where credit is due. Accentuate the nice things where we can honestly do so. Let us not always be known as "the bad news boys." Let us remember that "Mr. Big" did not build the business without some real ability and just because he is not an accountant does not mean he hasn't got a brain in his head. We can help the boss to see the fundamental facts and appreciate the fundamental relationships, but need not give him a full dress parade of our accounting knowledge every time we present him with a report. He knows we are accountants or he would not have hired us. We should give him information in a form which he can understand readily and pass on quickly to the stockholders and directors. Let him take the bows. He not only deserves it but is in a better position than we to pass judgment on matters which affect the over-all activities of the company.

Treat Everybody as a Prospect

As accountants, we should all be salesmen. We are not only responsible for preparing and analyzing the data but also for presenting and selling it to members of the organization; operating, selling, administrative, and top management. As such, everyone we contact is a prospect for our wares, consisting of facts and figures. Most sales which are consummated are a result of the meeting of the minds of the respective parties. The greater our ability to sell our wares to our associates, the more valuable our work becomes. We must, therefore, approach each sale well

prepared to handle our prospect and to present our story in a persuasive, sincere, and friendly manner. We may pound hell out of our calculating machines but we must handle our associates with a gentler touch. Someone once said that Samson slew the Philistines with a jawbone of an ass. He also added that many sales are lost every day with the jawbone of the same animal.

To do a better selling job we also must get the prospect's point of view. To do this we must associate more with the operating people. We cannot sense their feelings or fully appreciate their problems if we spend ninety per cent of our time chained to our desk. The myopia which we may have developed from years of staring into our ledgers has to give way to a far-sighted approach to the other fellow's problems. It is difficult to do an accurate accounting job by remote control because so far radar and television have not been adapted to the accounting field. So it is well to take a spin through the operating departments and improve our relationships with our fellow associates. It removes artificial barriers and it is one more step in the direction of better understanding.

Conclusion

Thus, we come to the close of this highly unprofessional treatise feeling somewhat shocked perhaps that anybody could taint the noble accounting profession with the implication that supersalesmanship and merchandising might have a place in our tool kit. We probably feel that the emphasis has been put in the wrong place, for we secretly fancy ourselves to be real personality boys and cannot help emitting a sly chuckle as we think of how this article applies to "old George." He should really read this article. He certainly is an old grump. Actually, however, the emphasis has purposely been put on the wrong syllable in hopes of jarring our staid and stolid thinking one-tenth of an inch left of the conservative point of view and leaving some of us with the thought that there may be something to this "mumbo jumbo" which our brothers in the sales department seem to use so effectively in selling our products. Let us remember that the accounting books, periodicals, magazines, and publications are brimful of right and wrong ways to do most everything in the accounting field, but the only ideas that really count are the ones which we are able to sell to the other fellow.

BUDGETARY CONTROL OF PLANT MAINTENANCE COSTS

by EARL V. HOPTON, Budget Director,
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THE COST of repair and maintenance has always been an important item in most manufacturing enterprises. It frequently represents five per cent of the sales dollar. With the advent of a highly competitive economy, maintenance costs become of increasing importance, particularly for those plants in which present performance is not relatively as economical as during prewar years. We know, of course, that intelligent control of repair and maintenance cost cannot be measured solely by the amount of expenditure. We have long realized that unreasonably low maintenance standards are not desirable since they cause interrupted production schedules, which result in the loss of machine output and labor effort, and affect customer service. Allowances for repair and maintenance costs must also recognize the importance of product quality, scrap losses, and particularly the safety of the operator.

It is difficult to establish adequate records and accounting devices for the control of repair and maintenance costs of machinery, buildings, and tools. The usual accounting records and statistical information tend to obscure the significant facts that have proved so useful in the control of other manufacturing costs. Some of the factors contributing to the difficulty of the problem of setting up satisfactory information and to the effective use of records for maintenance control purposes, are:

1. The responsibility for determining requirements and for exercising control of plant repairs is usually divided between the production and the maintenance departments.
2. Certain repairs, such as tear-down and major overhauling jobs, recur irregularly.
3. There are breakdowns and accidents that cannot be foreseen.
4. Costs vary with the age of different plant units.
5. It is impracticable to measure the cost of all repairs by means of the predetermined, job-estimate method.
6. There is a consensus of opinion that incentive payments, based on measurement, are not generally applicable to repair and maintenance work.

7. Some engineers assert there is little relation between production volume and repair costs, particularly for short periods, since it is often more economical to defer maintenance to periods of low production.

Besides these reasons, there are other factors of recent origin which have made it difficult to keep repair and maintenance expense in line. The costs of plant and equipment repair and maintenance rose abnormally during the war years, due in a large measure to the lowered qualifications of mechanical crews. The shift of trained artisans to military services necessitated a thinner spread of qualified mechanics over the greatly expanded production activity. Some plants have experienced little improvement in the effectiveness of maintenance work since the return to peacetime operation, even after allowances are made for higher wages and increased prices of supplies and parts.

Responsibility for Plant Maintenance

Discussions of repair and maintenance costs frequently revolve about the organization of the maintenance department and its duties. Sometimes it is described as being a service department, implying varying powers of initiative, usually exercised only upon request of operating departments. In other cases, maintenance departments appear to lead in the exercise of judgment for determining which equipment should be repaired. They empirically schedule all work, and the foreman of the production department apparently exercises little intiative in regard to the plans. These discussions of organization procedures are undoubtedly important, but in most instances the economical use of plant and equipment is a joint responsibilty that must be shared by both production and maintenance service departments. I believe both line and functional responsibility for maintenance exists in most plants regardless of the form of organization setup.

The production department foreman uses the equipment. He may also misuse or even abuse it. He may fail in the task of preventive maintenance. On the other hand, the maintenance department may do poor quality work, or assign unqualified craftsmen to the repair job. The millwrights and field men may be poorly supervised and may soldier on the assignment. In some cases, good engineering techniques are not followed, or good judgment is not exercised in advising the redesign of the machine or its

removal. Economical practice is achieved only when both the production and maintenance departments team up. It would become much simpler if this responsibilty could be tied to one person or one function, but in most instances, a good job results primarily from the cooperative approach. For this reason the budget is used by many plants as a device for assisting in the control of these costs.

Description of Maintenance and Repair Jobs

Control can be effected more easily if the data clearly represent the requirements of the situation and are expressed simply in terms that are commonly understood. If we agree that these costs are the responsibility of the production and maintenance departments, it becomes essential to establish requirements and to report the performance against them by means of clear and understandable descriptions. A foreman cannot intelligently discuss costs with the maintenance department by language that is too general and is expressed in quantities or values that are not specific. He cannot arouse intelligent interest by claiming, for example, that maintenance and repair costs for his department were fifty per cent higher than last month. This approach is too vague and unimaginative. It is usually unsatisfactory to refer to the maintenance costs by general descriptions, such as the buildings, machinery, or tools in his department. What type of building maintenance? What descriptive class of machinery repair? What specific kind of tool cost? Let us not waste time in unintelligent conference!

Plant Repair Orders

Repair jobs are usually initiated and scheduled by plant repair orders comprising several distinct types, dependent upon the estimated cost of the job, and upon the approval required by management at various levels. But costs accumulated against the various kinds of plant repair orders are not too helpful. The description of the repetitive repair orders often varies, and the jobs sometimes overlap. By the use of repair order costs alone the analysis work becomes cumbersome and difficult. The forest is obscured by the trees. But if the repair order code designates the class or type of equipment for which the work is proposed, a means is readily provided for accumulating information which is definite and permits the collection of data that are more imaginative. In

using this plan the charge code required on plant repair orders is expressed as shown in the example:

Charge Code:	126	—	13200	—	10	—	412	—	148
Which Designates:	Plant		Expense Control		Mechanical Craftsman		Production Cost Center		Class Description
As Illustrated:	Camden		Maintenance & Repair		Millwright		Cork Mill		Vertical Conveyor

The class description is represented by the last group of digits, and although it is not useful in the financial accounts, it provides invaluable information for those charged with the responsibility for the control of costs in the plant. Although costs should be accumulated by cost center through the use of repair orders, I believe that the reports of costs should be made by class description. This approach is more helpful to the production foremen and the maintenance department, because it

1. Directs attention to significant causes.
2. Stimulates constructive thinking.
3. Provides a means of intelligent trend analysis from period to period.

The plant repair order costs are used in a supplementary manner. An illustration of typical class repair charges, as accumulated by cost centers, and by buildings, machinery, or tools is shown in the abridged list below:

	Class Code	*Typical Class Elements* *Class Description*
Machinery:	152	German Mixer—Repairs (excluding knives and tail plates)
	149	B & Z Mixer—Repack hood and doors
	138	Calendar machine drives
	166	Print machine band repairs
	191	Asphalt storage tanks (including pumps, piping, and steam specialties)
	199	General machinery repair (not specifically classified)
Tools:	214	Regrind and replace doctor blades
	215	Chain blocks—repairs and replacements
	221	Paint pans

	229	Trailers—all types
	224	Wooden spacers for tops of stoves
	299	General tool repair (not specifically classified)
Buildings:	310	Lighting system (including bulbs)
	318	Roofs
	317	Roads and walks
	320	Sewers and sewer lines
	313	Sanitary fixtures and lines (including urinals, toilets, washstands, showers, hot water tanks, etc.)
	399	General building repairs (not specifically classified)

In many cost centers it has been found necessary to use only three or four class descriptions. Only the more important causes are shown separately by classes. The descriptive classes assigned to maintenance and repair work in one cost center may be found relatively unimportant in another cost center of the plant. A general class should therefore be set up for collecting small miscellaneous repairs, which are considered relatively unimportant. We should attempt to segregate only the larger or more significant classes of costs, so that attention is directed to jobs which afford a means of constant improvement either by the methods employed, material used, or inspection required.

Cost should be accumulated against the individual plant repair orders also. This permits a check of actual against the estimated cost, but of greater importance is the supplementary use of the specific repair orders in further analyses of costs accumulated under specific class descriptions, which appear to be out of line.

Reports by Descriptive Classes

The success of the work of the industrial accountant as a real aid in managing depends upon the methods used in collecting the basic information. The organizing methods must be sound and encourage cooperative action. It is important that the descriptive classes be designated only by the men who know the equipment, those who use it, and those who repair it. The plan will fail if the accountant simply establishes a system of maintenance class costs without consulting the production foremen and the maintenance department supervisors. But the procedure becomes constructive

when the latter determine the types of maintenance considered important in each cost center. They at once become interested, because the persons charged with the responsibilty have expressed their thinking. It is now their tool.

The data for accumulating costs by description classes should be arranged so that trends are indicated, and they should be presented as simply as possible. The report illustrated as Exhibit 1 shows a columnar arrangement which allows for showing the labor and materials costs separately by descriptive classes for each cost center. The report is issued to the production foreman and to the maintenance service department, and may be used to

1. Interpret the variances from the allowance shown on the budget report, which is confined to a statement of total costs for buildings and machinery and tools for each cost center.
2. Exercise judgment as to the validity of the expenditures.
3. Stimulate thinking on the adequacy of the equipment or its design in respect to the expense incurred for maintenance.

Besides reporting the trend of expenditures currently, it is recommended that the cost center maintenance class costs be accumulated by years, similar to the example illustrated as Exhibit 2. This chart shows the labor maintenance cost for the years 1940 to 1945. Since wage rates of the mechanical forces have changed during this period of years, a factor for adjusting the rates to a common basis (in this example the rates for the year 1943) has been applied to the total labor cost for the cost center. The advantage in eliminating price from the comparative trend information is obvious. Price adjustments should be made for material maintenance costs also. Since material usually includes supplies, parts, castings, and even maintenance services of other firms, it is impossible to derive an absolutely accurate price adjustment factor, but approximate accuracy is attainable.

Establishing the Repair and Maintenance Budget

A budget is too often thought of only as an allowance—a figure against which actual expenditures are compared. Careful reflection will indicate that this viewpoint is rather limiting and narrow. The budgeting process should always tend to provoke constant application of thought processes; it must constantly stimulate ac-

MAINTENANCE COST RECORD - SEGREGATED BY IMPORTANT CLASSIFICATIONS

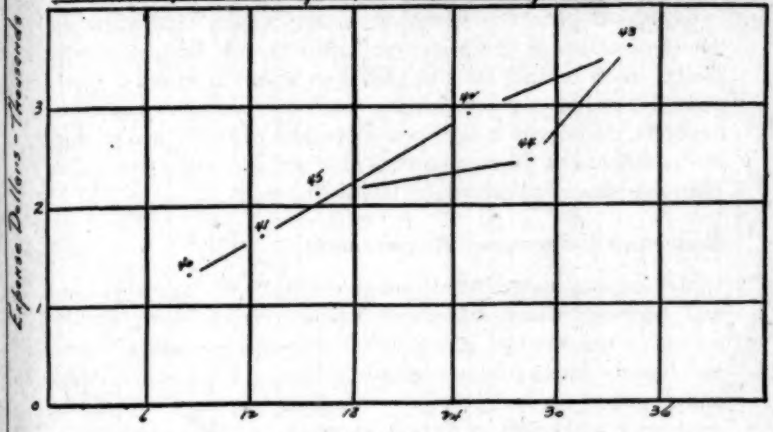
Operation 016 - Pressing Plant Pittsburgh Year 1946 Operation No. 016

Class	Description	LABOR						MATERIAL					
		Jan.	Feb.	Mar.	Apr.	May	June	Jan.	Feb.	Mar.	Apr.	May	June
	Activity Basis-Std. D. L. Hours	1,518	1,664	1,609	1,906	1,450	1,532						
	Machinery Repair and Maintenance												
120	Conveyors - Belt type	17	4	25	16	21	6	20	15	5	74	10	4
121	Conveyors - Cable type	11	-	4	3	30	3	-	-	17	-	20	-
139	Motors	4	8	8	1	19	20	-	-	2	18	-	-
143	Presses - Type P.B.	101	86	216	282	171	129	20	43	50	157	57	125
151	Starters, Compensators, Controller (not including wiring)	5	7	4	4	4	5	-	-	-	-	-	-
199	General - not specifically classified	1	4	5	4	7	3	-	6	-	-	-	-
	Total (Dollars)	139	109	262	310	252	166	40	64	74	249	87	129

EXHIBIT 1

Machinery Repair

Factory - Pittsburgh Dept. - 016 - Pressing Expense = Labor



Standard Direct Labor Hours - Thousands

Year	1940		1941		1942		1943		1944		1945		1946	
Activity - Basis: Stand. D.L. Hrs	3477		12577		24874		24311		28321		15870			
Classifications	BOOT	H.R.	BOOT	H.R.	BOOT	H.R.	BOOT	H.R.	BOOT	H.R.	BOOT	H.R.	BOOT	H.R.
120-Conveyors-Belt	34		114		103		187		141		96			
121-Conveyors-Cable	47		19		93		89		38		103			
139-Motors	16		9		108		155		94		130			
143-Presses-Type PB	858		1439		2211		3028		2018		1773			
151-Starters, etc.	(not segregated previous to 1945)										74			
199-General	248		244		309		204		260		94			
TOTAL (Dollars)	1203		1625		2724		3463		2551		2770			
Adjustment Factor - (Wage or Price)	144		183		110		-		(68)		(54)			
ADJUSTED TOTAL (Dollars Charted)	1347		1760		2784		3463		2459		2116			

EXHIBIT 2

tion and provoke plans for attaining more economical results. Many product costs and expenses can be resolved into rather concrete goals against which plans for achieving the desired end can be visualized without reference to records of past experience. In the preparation of the repair and maintenance budget by cost centers much reliance must be placed on historical records. However, the use of cost information based on class descriptions reduces the planning to a more nearly concrete basis. It then permits the establishment of requirements that are a constructive aid in control methods and procedures used in the plant.

Budgeting Maintenance Requirements

Maintenance budget requirements should be set up in two general categories which, for want of better nomenclature, are described as routine and nonrepetitive maintenance work. Routine maintenance implies those regularly recurring costs of adjusting, oiling, inspecting, and preventive repairing necessary to keep the productive equipment in a good operating condition at all times. Nonrepetitive maintenance represents the tear-downs and major overhauling jobs which usually occur less frequently over a relatively long period of two or more years. Jobs of this character include reblading of turbines, relining of bearings, painting of equipment and buildings, replacing of rams, overhauling of motors, etc. Although experience and practice dictates the establishment of current requirements for routine maintenance at varying production volumes, the estimated requirements for maintenance of a nonrepetitive character must be determined primarily by careful inspection of the plant equipment.

In budgeting maintenance costs, the requirements should be established by the maintenance department supervisors with the assistance and approval of the production foremen. Obviously maintenance shops and organization expenses should be excluded from the budget prepared for each cost center. Although a share of these expenses is distributed to each cost center for the purpose of determining product costs, it is clear that the responsibility for controlling maintenance shops and organization expenses lies solely with the maintenance department supervisor. A separate budget should be established for these general overhead expenses.

An example of the data sheet used in preparing the repair and maintenance budget is shown as Exhibit 3. It should be noted that

Plant SOUTH BRAINTREE Year 1947

Maintenance Expense Budget - Based on Month (X) or Year ( ).

Operation 022-Tubecoize-Small Presses
Type of Expense M.R. & M.
Activity Basis D. L. Hrs.
100% Activity 3180

Code	Classification	Routine Expense Labor Probable 25 %	Labor Activity %	Labor Activity 100%	Material Probable 25 %	Material Activity %	Material Activity 100 %	Major Nonrepetitive Yearly Fixed Description	Labor	Mat.
133	Pipe Lines - Water, Air Hydraulic, Steam	$ 25		$ 60	$20		$45			
134	Presses & Lift Tables	30		70	50		115			
167	Presses (Changing Gaskets)	10		25	15		40			
168	Operating Valves only (Sinclair-Nicholson etc.)	10		25	5		20			
169	Press Operating Return System (Including sump pipes and pumps)	5		10	5		15			
170	Cool Down Lines (Presses)	15		35	5		20			
199	Misc. M. R. & M.	15		35	20		45			
								Replace Ram on Small Press	$ 100	$250
	Totals	$ 110		$260	$120		$300		$ 100	$250

Formulation: -

	Labor		Material
Fixed	$ 60	Fixed	$ 60
Variable	$200	Variable	$ 240
Var. Rate per M.	$ 62.89	Var. Rate per M.	$ 75.47

EXHIBIT 3

the form provides for making the estimates by class description at representative cost center loads; and a section is allowed for the less frequently recurring jobs, referred to as nonrepetitive maintenance. The requirements at varying activities or loads are formulated into fixed and variable cost components as shown on the lower part of the form.

Other Tests of Maintenance Activities

Although major swings from the average trend are sometimes experienced, the maintenance cost for the plant as a whole should tend to be rather stable year after year, when allowances have been made for production volume changes and major additions or removal of equipment. Before the budget plan is approved, the maintenance allowance should be tested against the trend for the past several years. Supplementary devices showing relative trends, after taking volume fluctuation into consideration, though not exact, will prove helpful in bringing into focus a broad view of the conduct of maintenance activities. Some of the supplementary gauges that may be employed are:

1. Trend of the relation of maintenance costs to the original installed cost of plant assets. These ratios should be developed by labor and material separately for buildings, machinery, and tools. Maintenance costs should be adjusted to a common price level.
2. Charts showing total maintenance labor and material costs separately in relation to over-all plant production volumes expressed in standard direct labor hours.
3. Ratios showing the number of men in the mechanical force compared with
   a. Total plant direct labor personnel.
   b. Original installed cost of plant assets. (If the mechanical force is large, it is interesting to test this trend by crafts; millwrights, electricians, carpenters, pipe-fitters, etc.)

The accumulation of historical data showing the relations of maintenance costs to the gauges outlined above supplies a thought-provoking test of maintenance expense budgeted for a coming period and it is recommended that this check be made before final approval is given to the budget.

Conclusion

If the presentation of maintenance cost information is to prove helpful to management, it must be made in such manner as to be interpretative and provocative. These projections should be prepared in such a manner as to stimulate new interest in the direction of effort employed in discharging the important function of maintenance in a manufacturing industry.

The conduct of maintenance activities is always influenced by the effect of poor supervision, laxity in maintaining plant standards, quality and training of mechanics, and the attitude of employees. With the end of the war, industry in general is planning new construction and equipment additions. Postwar plans including the rearrangement of equipment and many other pent-up changes and improvements will blossom as soon as the materials and men can be procured. Maintenance forces will be enlarged during this period. Past experience has shown that following the completion of major capital expenditure programs, there is a hesitancy on the part of management to reduce maintenance crews to a level justified by economical operation. It is well, therefore, for the accountant to review his procedures and methods of reporting maintenance costs at this time, to be certain that they will prove adequate in assisting management to control this important item of expense.

Cost Accounting A Valuable Tool

It is not our intention to suggest that good cost accounting is a panacea for business and economic ills, or that scientifically determined cost data are substitutes for sound business judgment. We are convinced that cost accounting is a highly valuable tool which business management must utilize if optimum operating results are to be achieved. We believe that the use of cost accounting should be widely expanded for both managerial and pricing purposes.

Martin L. Black, Jr. and Harold B. Eversole, "Cost Accounting in Price Determination," in The Journal of Accountancy, *November, 1946.*

COST ACCOUNTING FOR CONTRACT DRILLING

by LELAND BRECKENRIDGE, Secretary,
American Association of Oilwell Drilling Contractors,
Dallas, Texas

MANY N. A. C. A. members have no direct connection with the oil business and, therefore, have only an academic interest in its accounting procedure and problems. Hence, I should like to introduce this subject by stating the accounting objectives which the American Association of Oilwell Drilling Contractors is attempting to carry out in the drilling business. First, there are no ulterior motives behind the program. Our purpose is quite simple. We are trying to keep drilling contractors from losing money through lack of information about their operations, because it hurts everybody in the business when one goes broke that way. We know, of course, that it would not be possible to keep all drilling contractors solvent, any more than it would all filling station and grocery store operators, and probably no more desirable. There is nothing altruistic about it. It is just a matter of good business.

Full Disclosure

We have an occasional inquiry from some operating or drilling firm as to whether or not our accounting books are available to those who are not members of our association. Our attempt to be of help in improving the effectiveness of drilling accounting records is directed at the entire industry, and our suggested practices are available to any interested reader or user. We are in much the same position as the East Texas farmer who had a habit of winning the Blue Ribbon award at the county fair each year for his seed corn. After the contest was over, he would give to each of his neighbors some of his prize-winning seed. Folks would say to him: "You are foolish. You are contributing to your possible defeat by making each of your neighbors a competitor." To which the farmer would reply: "No, I'm not crazy, I'm smart. I know something about corn which you don't seem to know, which is that it cross fertilizes. Pollen is blown from one field to another by the wind, and I don't want the quality of my seed reduced by pollen from sorry corn in my neighbors' fields." That is exactly the way we feel about our accounting program. The more good information any drilling contractor has about his operations, the less

likely he is to be bidding in work at a price which will eventually ruin him and everyone else who has to operate competitively against him.

Neither do we have anything to hide from the people we work for. This statement quite obviously includes the supply and equipment companies, to whom, along with the banks, we are always deeply indebted. Most of the larger operating companies and equipment companies have copies of our manual, and some of them have multiple copies. We want them to have it, because we want them to know that we operate on a businesslike basis, and even if we don't, we want to create that impression. We want them to know that in arriving at the cost of our work we are systematic and careful. We do not lose by this; we gain, because the people we work for do not want us to lose money. They expect us to keep the best and most modern equipment, in good condition, and capable, trained employees to operate it, so that our work for them will be fast and efficient. They know that in order to do these things we have to make a reasonable profit on our work.

Necessity for Costs

We are not trying to establish uniform costs and we have no price-fixing ambitions. We have no interest in knowing what the cost of any contractor's work is, but we are tremendously interested in helping him know his own costs, and we are convinced that if there ever was a time in the history of the business when he needed to know them that time is right now. The only suggestion we have to make about price is that it should be at least a reasonable amount above the total direct and indirect cost of the work done, whatever that may be. This should not be exactly a startling or revolutionary statement.

Instead of removing competition between drilling contractors we hope only to make it more intelligent. There is no magic in our accounting suggestions to transform an inefficient contractor into an efficient one. They are not a substitute for good tools, good men, and drilling know-how, though certainly they are an essential part of good management. Good well cost information is something like an X-ray picture. The picture does not effect the cure; it just shows the doctor where to go to work, and you find out whether you have a good doctor or not by what he does to relieve or remove the ailment after he has located it. That is about all we claim for good accounting practice. It is not a cure, it is just a picture of what is wrong or right in your operations.

By emphasizing the positive value of sound accounting procedure, we are trying to secure for the accounting department the important place in the organization which is deserves, if it functions properly. We are trying to impress upon the contractor that his accountant is not just an evil forced upon him by the revenue laws, a dead expense to be ignored except at tax time, but that he is, or can be, just as much a part of the money-making machinery as the tool pusher, provided he is given an opportunity.

Well Cost Accounts

"But," you say, "about those accounting practices you keep referring to, what have you got that others do not have?" The answer is, not a great deal. No new cloth maybe, just a little different pattern. The first reaction of the average accountant when he examines our suggested well cost extension is: "It's about the same as the distribution I am using now, except for a difference in arrangement." Of course it is. That is not a result of pure coincidence. Any contractor who uses drilling equipment to dig a hole in the ground in search of oil is going to encounter substantially the same types and kinds of expense as any other contractor engaged in a similar operation. He will spend money for labor, supervision, supplies, repairs, bits, trucking, pits, mud, and so forth. So, quite naturally, when we come to make a list of the items of our expense the names used are going to be largely the same. About the only difference is, usually, a difference in arrangement, but we think this difference can be important. The normal reaction and, from my experience I think I may safely say, the normal practice, is to list the items of well cost in the order of their obviousness. Labor comes first almost always, followed, perhaps, by trucking and bits. Then, mixed in with mud, pits, derrick, and cement, come the supply and repair expense items necessary to operate the rig.

In developing a suggested extension of well costs, we have had to keep in mind that contract drilling firms range in size of operation from one rig to fifty or more, and in office personnel from one all-purpose clerk or part-time bookkeeper to a large and competent staff headed by certified men. With that picture before us we have tried so to arrange our cost accounts that a one-rig contractor without expert office help can accumulate his well costs under a few broad classifications, and have the same basic cost information on

his work as a contractor with more extensive operations, skilled office help, and a more extended cost distribution. He will, of course, not know as much about the details of his cost. If supplies, or upkeep, or other operating charges run high on a particular rig or job he will not know without further research just what is causing the trouble, but he will have the total cost in the proper general classifications.

Primary Divisions

With this need in mind we have suggested, and illustrated in our manual, three degrees of well cost extension. Not with the idea that these divisions are the only ones possible, or that they are inflexible, but in order that there might be comparative uniformity in the well cost accounts of drilling contractors, regardless of the extent of their operations. Our first step was to break down the cost of drilling a well into seven general classifications, which we have called major factors. These primary divisions are:

1. Labor and supervision
2. Supplies
3. Maintenance and repair
4. Ordinary operating expenses
5. Other operating charges
6. Depreciation
7. Overhead

Then by logical and consistent development of these major factors we have illustrated how more detailed operating information may be accumulated, its extent depending on the requirements of management and the size of the office staff. We surely do not represent that all of the distribution accounts listed on our chart should be used, or only those. Our interest, as suggested before, is more in the arrangement of the accounts.

Accounting for contract drilling cost requires accuracy plus speed. There is not time between the completing of one job and the starting of another to make a complete compilation of all of the costs on the first job. These costs may not all be in for thirty or sixty days and by that time another contract may be well along toward completion. We are not in position to wait so long to find out what work costs. We must know before we take a job what it is going to cost, within narrow limits, unless we have a cushion

of cost-plus to fall back upon. Such advance information may be gained in part from past experience. Hence, we have tried to arrange our cost accounts so that they will provide it, through the development of proved averages.

In other words we are attempting to apply to the business of contract drilling the principles of true cost accounting. Cost accounting is not just tabulating and classifying results after the incidents leading up to these results have happened. That is bookkeeping. Cost accounting involves projecting past experience into future work and then proving or disproving the estimates by actual figures.

Fixed Daily Costs of Rig Operations

Reference to Exhibit 1 shows that we have tried to accumulate under the first three major factors those expenses which are incident to the usual operation of a rig. These consist of outlays such as labor, supervision, and the supplies and repairs needed to keep the table turning. These expenses may be reduced to a dependable average figure for a usual operating day for an identifiable drilling rig. By dividing the total of the expense of operating a given rig over a period of time or a series of contracts by the number of rig operating days in which it was incurred, a highly important daily average cost factor may be developed which may be used in estimating the cost of future work. Armed with this figure for each of his rigs the contractor can fix his attention on the number of days required to do the job and thereby eliminate much of the guesswork involved in bidding.

These averages have other uses also. Immediately upon completion of a job an amazingly close estimate of its cost may be had by substituting actual days for estimated days and multiplying by the factor. If the factor is $450 per day and the job required ten days longer than was estimated it is immediately apparent that expected profit has been reduced by $4500. Needless to say, current completions must be checked against the average in order that a trend upward or downward may be detected. Variation from the factor on one contract does not disturb the contractor or indicate that the factor is wrong, because some unusual repair or replacement expense may have been incurred on the job. A trend in either direction, however, may indicate that the factor requires adjustment.

EXHIBIT 1

WELL COST EXTENSION CHART
CONTRACT DRILLING EXPENSE—ROTARY—90-11

Condensed Accounts	*Subaccounts*	*Further Subdivisions*
1. Labor and Supervision	11 Labor	
	12 Supervision	
	13 W.C. & P.L. Insurance	131 W. C. Insurance 132 P. L. Insurance
	14 Crew transportation	
	15 S. S. Taxes	
	16 Auto expense—Direct	
2. Supplies	21 Rig supplies	
	22 Hand tools	
	23 Valves, fittings and line pipe	
	24 Oils and greases	
	25 Fire and other insurance	
	26 Property taxes	
3. Maintenance and repairs	31 Drawworks—Repairs and parts	
	32 Pumps—Repairs and parts	
	33 Power and Transmissions—Repairs and parts	331 Engine, gen. and motor 332 Boiler plants 333 Transmissions and chains
	34 Overhead string—Repairs and parts	341 Blocks, hooks, etc. 342 Swivel 343 Wire line 344 Rotary hose
	35 Other equipment—Repairs and parts	351 Rotary 352 Electrical equipment 353 B.O.P., etc. 354 Operation instruments
	36 General maintenance expense	361 Other shop and weld. expense 362 Gen. maint. exp. 363 Trans. of supplies
	37 Fishing, repairs, parts, rentals	
	39 Drilling string—Repairs and parts	391 Drill pipe—Repairs and parts 392 Kellys, collars, etc.—Repairs and parts

EXHIBIT 1 (Continued)

4. Ordinary operating expense	41 Bits and reamers	
	42 Transportation and rigging—In and out	421 Trucking—In and out
		422 Other trans.—In and out
		423 Winch work and spotting
5. Other operating charges	51 Location and preparatory charges	511 Pits and dirt work
		512 Derrick, rental, erection, etc.
		513 Lumber
		514 Roads, bridges, clearings
	52 Fuel	521 Fuel
		522 Fuel lines
		523 Fuel stg. and trans.
	53 Water	531 Water
		532 Water lines
		533 Water stg. and trans.
	54 Mud and chemicals	
	55 Coreheads and coring	
	56 Well equipment	561 Casting and tubing
		562 Heads and shoes
		563 Cementing and cement
		564 Tanks and separators
	58 Special services	
	59 Special materials	
8. Depreciation	81 Rig depreciation	
	82 Drill pipe depreciation	
9. Overhead	91 General overhead	
	92 Administration expense	

Renewals

There arises here the question of how to treat minor replacements which are properly expense items, but which have a normal useful life of more than one contract, such as wire lines and rotary hose. The accounting decision is whether they should be charged directly to a job or impounded in a clearance account and prorated to work done on the basis of active use days. The latter procedure is probably more correct technically, but when working with averages we can see no great objection to making the charge directly to the job in progress. If the period included in the average covers a sufficient spread of time or jobs to make it dependable then such items of expense will be included either way, and the practice of charging directly to the job is simpler.

Major overhaul expense, which is usually incurred while a rig is idle, should be distributed back to the work period during which the wear was caused, on the basis of active rig days, otherwise there will be a disproportion between the daily average operating expense for the early life of a rig and its later use which does not reflect true conditions. While it is obviously true that new equipment is cheaper to operate it must not be overlooked that wear is occurring which must be repaired later. The elapsed period between major overhauls will be the basis of spreading back such expenses.

Variable Costs

Thus far we have been dealing with the expenses accumulated under the first three major factors, those incident to the normal operation of the drilling machinery on location and reducible to dependable averages. In primary divisions four and five we have grouped those costs which are incurred in the drilling of a usual contract well, but which vary in amount with distances, with the nature of the formation penetrated, and with contract provisions. Bits, trucking, derrick, dirt work, fuel, water, mud, and special services or materials are some of these. Because they are affected by drilling conditions they are not properly reducible to dependable daily average figures for bidding purposes except, of course, for work in the same or a similar area. On each new job which involves a change in drilling conditions and a move to an unfamiliar area, they must be estimated anew in the light of distances, formation to be penetrated, and provisions of the drilling agreement.

Depreciation and Other Overhead

The last two major factors, numbered eight and nine, are for the indirect but important costs of depreciation and overhead, which may be neither overlooked nor minimized if operations are to be profitable. These expenses, we suggest, should be charged into operations currently on the basis of daily factors developed from past experience. Overhead usually varies little from one year to the next, hence a factor based on the preceding year will ordinarily be satisfactory.

So far we have been dealing principally with direct costs and our problem there is easier. When funds are actually withdrawn from the bank to pay an item of expense, that item is a bit hard to overlook or even to minimize. But when it comes to feeding back into operations investment money spent some months or years ago the proper allocation is not so easy, even when approached conscientiously, as sometimes it is not.

Since time, actual rig operating time, is the essence of our business, we have concluded that the most equitable way to charge wear-out expense on our equipment into our work is on the basis of the use of the equipment. For this purpose we suggest estimating the useful life of equipment in terms of operating days rather than calendar years, and feeding depreciation expense into current work on the basis of the number of such time units required for completion. Here, as elsewhere in this discussion, by an active day or a rig operating day is meant a full-crew day, that is, a twenty-four hour period in which the equipment is manned by a full crew.

This use-time method is not represented as the perfect answer to all depreciation problems, but we think it comes nearer than any other of the well-known methods to a recovery of investment through actual use. It has some of the good features of the diminishing rate method in that equipment will be kept busier during the earlier years of its life, so that the period of greatest use bears a proportionate part of the wear-out expense. Conversely, job costs in periods of reduced activity will not be overloaded, as is the case when each year bears the same amount of depreciation expense, irrespective of the amount of work done.

Rotary Rig Depreciation

We have suggested 1095 days as being a fair estimate of the actual operating life of a rotary rig. This is the equivalent in days of three calendar years. It does not mean, however, that if this use method is employed a rig will be fully depreciated in three years because, unfortunately, our equipment cannot be kept that busy. Under normal conditions, if investment were not increased by replacement of major elements of the rig, some five years or more would be required to absorb cost into operations. In actual practice, of course, capital replacements will be made to any rig which is kept sufficiently busy to use up any considerable portion of the 1095 days in that span of time. Each such addition further lengthens the period of time required to depreciate the rig fully.

Perhaps the finest refinement in depreciation practice is the unit use method, in which each unit of the rig is given a life estimate in terms of operating days and depreciated on that basis. This method, while admittedly more accurate, has the drawback of being considerably more complicated and slower in application to individual well costs.

On the subject of depreciation the contractor has always to consider the terrific impact of the taxing authorities. Probably a considerable majority are committed to a straight line method of computing depreciation for tax purposes, and the commissioner is slow to approve a change to a use method on old tools. On new equipment, however, approval of the operating day use method is not so difficult to obtain. We have tried, in our suggested practices, to keep from being influenced unduly by tax accounting where we considered a distortion would result, and this, we think, is eminently true in depreciation practices. We have observed little evidence on the part of the Bureau to develop a sound and dependable depreciation policy on either drilling or producing equipment. Many accountants, therefore, are employing the use method of charging depreciation to contract costs, even though they are bound to another method for tax purposes. This is effected by accruing the charge of current work, with a credit to a Reserve for Depreciation Estimate account. At the close of the accounting period the difference between the amounts credited to this account and the actual tax figure is cleared to Profit and Loss, or back through the job costs. Since we think our suggested practice more nearly approximates actual condi-

tions than the straight line time method, we suggest the former procedure.

Drill Pipe Depreciation

What has been said thus far on the subject of depreciation applies to the drilling rig exclusive of the drilling string.* Since repair and upkeep on the rig proper are charged directly to expense the rig depreciation figure is not affected so radically by the nature of the formation penetrated as is that used for drill pipe. Because of this direct effect of drilling conditions no over-all depreciation rates can be suggested for the drilling string. What in certain areas amounts almost to an expendable supply is in other areas a true capital asset. In each area, therefore, drill pipe cost must be charged to operation at a rate established by experience in that particular field. Because there is such a direct relationship between use and wear in the drilling string some form of the use method of depreciation is indispensable.

There are several methods of drill pipe depreciation in use, each considered satisfactory to the user. Some accountants use an inventory basis, in which the pipe is given an appraised value at the end of each job if it lasts through a full contract, and the difference between the beginning and ending values is charged to the job. Others charge drill pipe wear to current contracts on the basis of so much per foot per day for each size of pipe in use and still others simplify this latter practice by making a flat charge per day of use, as is done with the rig. These two last-named methods obviously presuppose an experience figure derived from past operations in the same or a similar area.

As supporting evidence for any method used we recommend the practice of keeping an operating experience record on each string of drill pipe in use. This record does not need to be complicated. It may be in card form, with information spaces for date of purchase, cost, size and length, operating days used, and footage drilled. From such a record a comparatively safe field depreciation rate may be developed either on a day or a footage basis.

Several contingencies can creep in to complicate this simple record but they are not insurmountable. For example, drilling

* In well drilling the term "string" denotes all of the casing or pipe of one size used in a well.

strings are sometimes transferred from one drilling area to another. This makes necessary an inventory appraisal of the value of the pipe at the date transferred and a separate record of performance in the new area. Not necessarily a new card but a new record. Where the transfer is made because the pipe is no longer considered safe for use in an area of hard wear the case is different. If a string is moved from West Texas, for example, after drilling two wells, because it is adjudged unfit for further work in that area, then the job costs for the two West Texas wells should absorb the cost of the pipe, less salvage value, if well cost figures are to be dependable, even though the pipe, as a shortened string, may be used for further drilling in softer or shallower formations elsewhere.

Replacement of Joints

Where certain joints in a string fail and are replaced, as is often the case, the record is not necessarily affected adversely, because it is general practice to expense the cost of such replacement joints. Replacing a few joints does not add materially to the life of the string as such, and the cost of upkeep to the drilling string is included in the well cost accounts. This statement is true also of the cost of replacing tool joints, where the original set has been capitalized as part of the cost of the drilling string.

As suggested above, the inventory method of estimating drill pipe wear is used by some contractors, and in certain areas is reported to be satisfactory and acceptable to the Bureau of Internal Revenue. It would seem that this method, to be acceptable, would need the support of some corroborating record much like the one described, or the pipe would have to be examined and valued by some one of the companies providing scientific inspection service, because if it were left to the toolpusher to estimate the value he would guess in terms of percentage of exhaustion.

Day Work Costs

There is a need for acceptable average figures for the cost of operating drilling equipment on company time, because this is a weak spot in our accounting records. In the space of a comparatively few years the time required in this part of the operation of drilling a well has stretched from three or four days, waiting for

the cement to set around the oil string and drilling out the plug, to a period of months in some cases.

Under a typical drilling contract the owner of the tools agrees to perform two distinct services. He contracts to drill a hole to specified depth at so much per foot, and then he agrees to rent the use of his rig and his men to the owner of the well for such other work as the owner may specify. For this last function he is paid an agreed amount per day or fraction thereof. He may, and often does, spend more time on day work than is required to cut the hole.

It is an obvious but belatedly recognized fact that the contractor must make his profit on both operations, and not depend on drilling profit to carry the day work as he used to do. The accounting obligation is to provide the contractor with a dependable daily average operating expense figure for the use of his rig on company time. Care must be exercised also to make certain that day work bears a fair share of overhead and equipment use expenses.

It is suggested that a fair and dependable figure may be developed by dividing the total expenses accumulated under the first three major factors by the total number of days consumed in the three basic functions of rigging up and dismantling, drilling, and day work. To this figure would be added any expenses incident to the particular job, such as derrick rental, water, fuel, etc., where these are furnished by the contractor. This procedure eliminates the one-time expenses such as trucking, derrick, pits, grading, etc., and such charges as bits and mud which are usually nonrecurring in day work. Any argument that this procedure weights day work unduly is offset, we think, by the tempering effect of the rigging up and dismantling days included in figuring the average.

Since days spent on company time are generally full payroll days we can see no valid reason for making a lesser charge to this work for rig depreciation and overhead than is made to the drilling operation. The requirements on the machinery are often heavier in performing day work operations than is the case in the actual drilling operation.

Where use of the drilling string is required in day work operations it is usual practice for the operator to pay an additional sum per day of use. This payment is based on the length of the string required, and is generally calculated on the basis of a rate per foot per day. Here again there is a definite need for a depend-

able cost figure for drill pipe wear. That our suggested method of arriving at the average cost of day work is not foolproof and is open to argument we are certainly not disposed to deny, and we are wide open to a better suggestion.

Conclusion

In this brief discussion I have tried to present some idea of our objectives, and of our conclusions about the best ways of achieving them. Our program is not finished. It has just fairly started. We have agreed on practices only after examining all that we could find, and when better methods are developed we hope to be progressive enough to adopt them even if we are not smart enough to conceive them. Our program will never be complete so long as men use rigs to drill oil wells because accounting is a growing and expanding thing.